

## ROCHESTER SCHOOL, RECOMMENDED READING

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The theme of the Rochester school is Random Matrix Theory, Analytic Number Theory, and the connections between them. Many of the participants at the school will arrive with a good background in number theory, and a smaller number will already have a strong background in random matrix theory. The lectures at the school will attempt to cover everything from scratch, but the most basic material will be covered quickly. The suggestions below may be helpful to you if you have time to prepare before the school. These articles are from the book *Recent Perspectives in Random Matrix Theory and Number Theory*, edited by Francesco Mezzadri and Nina Snaitch.

*Prime number theory and the Riemann zeta-function*, by Heath-Brown

This paper contains a lot of the basic number theory background. Read it carefully and try to absorb all of it. Most of this material will be mentioned in the Rochester school, but there will not be time to go into the details of the proofs. If you wait until Rochester to see this material for the first time, then you will become lost quickly.

*L-functions and the characteristic polynomials of random matrices*, by Keating

This paper gives a good description of the connection between  $L$ -functions and random matrix theory. Don't worry so much about the details of the calculations: just absorb the connections. If "Haar measure" is unfamiliar to you, go read that chapter in the book where you learned measure theory. Also look at the first few sections of Conrey's paper *Notes on eigenvalue distributions for the classical compact groups*.

*Compound nucleus resonances, random matrices, quantum chaos*, by Bohigas

This paper is easy to read and gives a picture of physics and random matrix theory, only touching on the early connections with number theory. Warning: the  $GOE$  ensemble features prominently in this article, but that ensemble probably has nothing to do with  $L$ -functions. In particular, the  $GOE$  is nothing like the orthogonal group with Haar measure.

*Notes on pair correlation of zeros and prime numbers*, by Goldston

*Basic analytic number theory*, by Farmer

*Applications of mean value theorems to the theory of the Riemann zeta-function*, by Gonek

All three of these articles should be reasonably accessible if you have worked through Heath-Brown's paper. The material in the papers by Farmer and Gonek will be covered in lectures at the school.

*Families of L-functions and 1-level densities*, by Conrey

The first four sections describe some of the most commonly studied families of  $L$ -functions. Everyone needs to know about those families.